DEEP VEIN THROMBOSIS

PHYSICIAN
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ACCESS SITES

- Most interventionists currently prefer ipsilateral popliteal vein access, which is achieved with use of duplex imaging or ultrasound guidance. This access site is preferred because the success rate is significantly higher, entrance is made directly at the location of the clot, and there is no need to traverse valves that are going in the opposite direction (when crossing valves with a wire, there is always the risk of damage to the valves).
- When popliteal access is not possible or is not the preferred approach, a contralateral femoral vein approach is our preferred alternate option.
- Less commonly (rarely) used approaches are: the jugular vein approach, dorsal vein access, and greater saphenous or lesser saphenous vein access.

DIAGNOSTIC DEVICES USED

SHEATH SIZES
We use a 4-F sheath initially. Because it is a small sheath, if we cannot cross the occlusion, there is a small entry hole, which results in less risk of bleeding and complications.

FLUSH DIAGNOSTIC CATHETERS
4-F hydrophilic coated catheter with an angled tip.

SELECTIVE DIAGNOSTIC CATHETERS
4-F hydrophilic coated catheter.

DIAGNOSTIC GUIDEWIRES
Hydrophilic coated wire (.018 inch to .035 inch, very soft to super-stiff type).

DIAGNOSTIC NOTES
- If there are dorsal veins visible or available, it might be preferable to enter into the dorsal vein with a small angiocatheter to obtain a venogram. In this manner, it is possible to assess the extent of DVT and determine if it involves the infrapopliteal veins. It will also allow the opportunity to determine the preferred access.
- If there is a problem with excessive DVT that extends beyond the origin of the popliteal vein, we might prefer contralateral femoral vein access, with a desire to advance the catheters and wires below the popliteal artery, possibly to the tibial peroneal veins.

INTERVENTIONAL DEVICES USED

INTERVENTIONAL GUIDEWIRES

Hydrophilic coated wires (.018-inch to .035-inch); we also use infusion wires to infuse the thrombolytic agent throughout the length of the thrombosis.

INTERVENTIONAL SHEATHS OR GUIDE CATHETERS

4-F or 5-F diameter interventional guide catheters.

MECHANICAL THROMBECTOMY DEVICES

Isolated Thrombolysis

- There is one catheter, the Trellis-8, that has balloons placed proximally and distally (10 cm to 30 cm long). When inflated, the isolated area between the balloons is accessible via multiple ports to allow localized infusion of the thrombolytic agent. A motor then activates a wire inside the catheter, which causes oscillations at 3,000 rpm, agitating and pulverizing the thrombus.

Mechanical Thrombectomy

- There are several thrombectomy devices that will fragment clot and reduce the clot into smaller particles, which then allows for removal of the particles from the venous circulation.
- There are several devices that use the injection of high-pressure fluid into the clot to take advantage of the Venturi effect.

PTA BALLOONS

Large balloon (8 mm to 10 mm diameter X 4 cm length).

STENTS

- In the iliac system, 10 mm diameter (occasionally 12 mm to 14 mm) and up to 40 mm in length (not infrequently up to 80 mm to 100 mm in length).
- Very rarely do we perform stenting in the femoral or popliteal areas.

INTERVENTIONAL NOTES

Until recently, treatment of DVT was typically done by catheter-directed thrombolysis, which would usually require dripping thrombolytic agent through the catheter, which would last for a minimum of 24 hours up to 72 hours. It was shown that the longer the thrombolytic agent was administered, the higher the rate of complications. Recently, the trend has become to perform expedited venous thrombolysis. This is achieved with the localized injection of a thrombolytic agent through a thrombectomy device, followed by aspiration of the thrombotic material. The whole procedure frequently can be completed in fewer than 90 minutes.

IMAGING

- Routine duplex imaging of the lower extremities will tell us the extent of DVT.
- Duplex imaging or ultrasound guidance for access.
- Venograms are an essential part of the procedure at the time of the procedure.

OTHER DEVICES

When using the contralateral approach (accessing the contralateral vein), it is necessary to use a catheter that will allow you to gain access—most commonly a curved catheter, in conjunction with a super-stiff, hydrophilic coated wire.

CONTRAST RECOMMENDATIONS

Nonionic

PHARMACEUTICALS

- Low-molecular-weight heparin for approximately 1 week after the procedure; also warfarin.
- We use clopidogrel combined with ASA for approximately 1 month after the procedure, when the use of stents is necessary.
- In extensive DVT involving the iliac system, patients will be on warfarin for at least 6 months.
- Patient who have a hypercoagulable state will be on warfarin indefinitely.

TESTS USED

- When the patient is admitted with DVT, we perform a hypercoagulability panel to determine if he or she is in a hypercoagulable state.
- During the procedure, we will monitor the ACT. ■